ASSIGNMENT 4

Textbook Assignment: "Drive Lines, Differentials, Drive Axles, and Power Train Accessories," chapter 5, pages 5-1 through 5-35.

4-1. Of the following functions, which one is NOT a function of a drive line assembly?

1. Provides a smooth power transfer
2. Allows up-and-down movement of the rear axle
3. Sends power from the transmission to the rear axle
4. Maintains proper alignment of the rear axle and transmission

4-2. Which of the following drive line components is used only on long wheelbase vehicles?

1. Universal joint
2. Center support bearing
3. Drive shaft
4. Slip yoke

4-3. What component of a drive line assembly transfers turning power from the front universal joint to the rear universal joint?

1. Slip yoke
2 Rear yoke
3. Drive shaft
4. Flex shaft

4-4. What component of a drive shaft assembly provides free movement in a horizontal direction and is capable of transmitting torque?

1. Slip yoke
2 Rear yoke
3. Front universal joint
4. Rear universal joint

4-5. What modification prevents drive shafts from vibrating at full-engine speed?

1. Magnafluxing the drive shaft
2. Welding small weights to the light side of the shaft
3. Placing weights on the opposite ends and opposite sides of the shaft
4. Truing the shaft on a lathe

4-6. What type of drive shaft is enclosed and rotates within a support bearing to prevent whipping?

1. Hotchkiss
2. Companion
3. Flange tube
4. Torque tube

4-7. What component of a drive train is used to allow changes in the angle of the drive line assembly?

1. Support bearing
2. Companion flange
3. Slip joint
4. Universal joint

4-8. What type of drive shaft design prevents shaft speed fluctuations?

1. A drive shaft containing two universal joints assembled 90 degrees apart
2. A drive shaft containing one universal joint and one slip joint on the same end
3. A drive shaft containing one universal joint at the transmission and a slip joint at the differential
4. A drive shaft containing one universal joint at the differential and a slip joint at the transmission

4-9. What type of universal joint is most often used?

1. Double cardan
2. Ball and trunnion
3. Cross and roller
4. Bendix-Weiss

4-10. What type of universal joint has two cross-and-roller joints in tandem to form a single joint?

1. Ball-and-trunnion
2. Double-cardan
3. Rzeppa
4. Tripod

4-11. In a front-wheel drive vehicle, the outboard CV joint is a sliding joint that transfers rotating power from the axle shaft to the hub assembly.

1. True
2. False

4-12. The balls of a Rzeppa type constant-velocity joint

1. transfers rotating power from the axle shaft to the hub assembly
2. maintains an equally divided drive angle between the connected shafts
3. furnishes the only points of driving contact between the two halves of the coupling
4. ensures angular displacement of the shafts are maintained by the outward movement of the balls

4-13. When the driven shaft of a Rzeppa CV joint is moved 30 degrees, the cage and balls move what number of degrees?

1. 10
2. 15
3. 20
4. 30

4-14. What component of a tripod CV joint is splined to the axle shaft?

1. Inner spider
2. Outer yoke
3. Outer housing
4. Axle hub

4-15. Of the following functions, which one is NOT a function of a pillow block bearing in an auxiliary power train?

1. To support the drive shaft
2. To maintain drive shaft alignment
3. To prevent whipping under heavy loads
4. To prevent shimmy and poor control

4-16. An operator reports hearing a grinding noise coming from the drive shaft. This report most likely indicates the existence of what problem?

1. A worn center support bearing
2. Worn splines in the slip yoke
3. A worn universal joint
4. A worn transmission housing bushing

4-17. Which of the following conditions indicates that a center support bearing is faulty?

1. A whining noise in the drive line
2. Failure of the vehicle to start moving smoothly
3. Frequent stalling when the clutch is engaged
4. Vibration from the chassis at low speeds

4-18. When performing a drive shaft inspection, you take what action to check the U-joints?

1. Move them by prying with a pry bar
2. Completely disassemble the joints
3. Measure the play between the cross and roller
4. Wiggle and rotate each joint back and forth

4-19. In what gear is a worn universal joint most often noticed?

1. First
2. Second
3. Fourth
4. Reverse

4-20. Lubricating universal joints with a low-pressure grease gun prevents which of the following types of damage?

1. Bearing damage
2. Seal damage
3. Bearing seizure
4. Over lubrication

4-21. You are removing the drive shaft from a vehicle. What component can be damaged if you allow the full weight of the drive shaft to hang from the slip yoke?

1. Rear U-joint
2. Front bushing
3. Extension housing
4. Support bearing

4-22. When reassembling a universal joint, you should use what type of lubricant to prevent the bearings from falling out of the bearing cap?

1. High-temperature grease
2. Wheel bearing grease
3. Water pump lubricant
4. Vaseline

4-23. What is the first indication that a vehicle has a faulty center support bearing?

1. A clunking sound when changing from acceleration to deceleration
2. A whining sound coming from the drive shaft
3. Excessive chassis vibration at low speed
4. The drive shaft begins to wobble causing abnormal universal joint wear

4-24. When replacing the center support bearing, you should ensure that the

1. bearing shield contains grease
2. grease fitting is in place
3. dust shield is placed in its grooves correctly
4. drive shaft alignment is maintained

4-25. Of the following functions, which one is a function of the differential in an automotive vehicle?

1. Connects the rear axles shafts
2. Allows the axles to turn at different speeds when cornering
3. Permits the driving axles to be driven as a single unit
4. Transmits power indirectly to the drive axles

4-26. What type of differential carrier is constructed as part of the axle housing?

1. Removable
2. Pinion
3. Integral
4. Axial

4-27. What component of a differential assembly holds the ring gear, the spider gears, and the inner ends of the axles?

1. Differential case
2. Differential carrier
3. Differential final drive
4. Differential windlass

4-28. The outer end of the pinion gear is joined to the rear U-joint companion flange by

1. bolts
2. lock rings
3. splines
4. snap rings

4-29. What component of a differential drives the ring gear?

1. Side gear
2. Spider gear
3. Spiral bevel gear
4. Pinion gear

4-30. When repairing a differential, you must replace the ring and pinion as a matched set.

1. True
2. False

4-31. What component of a differential is splined to the inner ends of the axles?

1. Differential integral gears
2. Differential idler gears
3. Differential pinion gears
4. Differential side gears

4-32. Which of the following gear ratios of a final drive provides a substantial increase in acceleration; however, fuel economy is decreased?

1. 2.78
2. 3.50
3. 3.71
4. 4.11

4-33. Which, if any, of the following components is part of a final drive?

1. Bevel drive pinion
2. Differential carrier
3. Saddle yoke
4. None of the above

4-34. What type of final drive designs are most often used?

1. Double reduction and two-speed
2. Spiral bevel gear and hypoid gear
3. Limited slip and cone clutch
4. Full-floating and three-quarter floating

4-35. What type of final drive has the pinion gear meshing with the ring gear below the center line and at a slight angle?

1. Hypoid
2. Spiral bevel
3. Double reduction
4. Limited slip

4-36. A 5-ton military vehicle is equipped with what type of final drive?

1. Single-reduction
2. Double-reduction
3. Two-speed
4. Limited slip

4-37. A two-speed final drive is limited to use in those vehicles containing one driving axle.

1. True
2. False

4-38. In a two-speed final drive, what component is placed between the differential drive ring gear and the differential case?

1. Clutch pack
2. Cone clutch
3. Planetary gear train
4. Sliding pinion gear

4-39. In a clutch pack type limited-slip differential, clutch packs are applied by the

1. centrifugal force of the spider gears and spring pressure
2. friction of the steel disc and spring pressure
3. spring force and the thrust action of the spider gears
4. side pinion gears walking inside the side gears

4-40. Under rapid acceleration, the differential pinion gears of a cone clutch limited-slip differential push outward on what components?

1. Side gears
2. Cone gears
3. Flange casings
4. Drive axles

4-41. What condition is generally accepted as the first hint of differential troubles?

1. Loss of traction
2. Vehicle vibration
3. Loss of lubricant
4. Unusual noises

4-42. Which of the following differential troubles will produce a humming noise?

1. Lack of lubrication
2. Improperly adjusted ring and pinion gears
3. Improperly adjusted pinion and side gears
4. Backlash is too great

4-43. Which of the following conditions generate a clunking sound in the differential?

1. Faulty differential gears
2. Worn axle support bearings
3. Excessive backlash between the ring-and-pinion gears
4. Loose carrier bearings

4-44. When removing an integral differential, you should inspect and mark the individual components as they are removed.

1. True
2. False

4-45. When replacing the seals in a differential, you should use which of the following tools?

1. Seal driver
2. Hammer and a block of wood
3. Slide hammer
4. Seal insert

4-46. Which of the following methods are used to adjust pinion gear depth?

1. Using a collapsible spacer
2. Tightening the pinion nut
3. Replacing the shim pack
4. Varying shim thickness

4-47. When adjusting the pinion bearing preload with a collapsible spacer, you should use which of the following tools to measure the pinion preload?

1. Dial indicator
2. Foot-pound torque wrench
3. Inch-pound torque wrench
4. Feeler gauge

4-48. Which of the following problems results from having a differential case bearing preload that is too high?

1. Ring-and-pinion noise
2. Overheated bearings
3. Too much backlash
4. Excessive differential case runout

4-49. Ring-and-pinion backlash is required for which of the following reasons?

1. To allow for heat expansion
2. To prevent ring gear runout
3. To ensure a good contact pattern
4. To ensure that the pinion gear is perpendicular to the ring gear

4-50. When checking ring-and-pinion tooth contact pattern, you note that the pattern is located on the upper edge (high contact) of the teeth. What corrective action is required?

1. Move the ring gear away from the pinion
2. Move the ring gear towards the pinion
3. Move the pinion towards the ring gear
4. Move the pinion away from the ring gear

4-51. The ideal tooth contact pattern on a used gear will have considerably more contact in which area of the gear?

1. The toe
2. The heel
3. The drive side
4. The coast side

4-52. A live axle only serves as a support for part of the vehicle while providing a mounting for the wheel assembly.

1. True
2. False

4-53. What type of axle housing is most often used?

1. One-piece
2. Two-piece
3. Guitar
4. Banjo

4-54. Why are automotive axle housings vented?

1. To cool the lubricant
2. To prevent pressure buildup
3. To prevent overfilling
4. To adjust for loads

4-55. The vehicle weight-supporting bearings in a full-floating axle are located

1. at the inner end of the axle housing
2. on the outer end of the axle shaft
3. on the outer end of the axle housing
4. at the inner end of the axle shaft

4-56. What type of drive axle allows the axle shaft to be removed without removing the wheel?

1. Full-floating
2. Semi-floating
3. Three-quarter floating
4. Half-floating

4-57. To permit the drive shaft of a front drive axle to pass beside the engine oil is accomplished by

1. using a constant velocity joint
2. using an intermediate drive shaft
3. using a transfer case
4. having an off-center differential housing

4-58. In the front drive axle of a four-wheel drive vehicle, what component transfers power from the drive axles to the drive wheels?

1. Locking hubs
2. Interconnecting shaft
3. Outer stub shaft
4. Sliding hub

4-59. In a front-wheel drive vehicle, what component of the front-wheel drive axle is splined to the side gears in the differential?

1. Interconnecting shaft
2. Outer stub shaft
3. Inner stub shaft
4. Rzeppa joint

4-60. What action allows for a change in distance between the transaxle and the wheel hub?

1. The plunging action of the outer CV joint
2. The plunging action of the inner CV joint
3. The sliding action of the short shaft spline to the side gears
4. The sliding action of the interconnecting shaft

4-61. Worn or damaged axle bearings produce what type of sound?

1. Clunking
2. Grinding
3. Humming
4. Growling

4-62. To help ensure axle bearing problems do NOT reoccur, you should take what action?

1. Determine the cause of the part failure
2. Perform all repairs according to the manufacturer's manual
3. Follow the shop supervisor's instructions
4. Install a higher quality part

4-63. When removing a pressed-on bearing collar from an axle, you should use which of the following tools?

1. Cutting torch
2. Hand grinder
3. Slide hammer
4. Bearing puller

4-64. When removing an axle bearing using a hydraulic press, you should place the driving tool so it contacts what area of the bearing?

1. The outer race
2. The inner race
3. The bearing collar
4. The bearing sleeve

4-65. What is the proper tool for removing a housing-mounted axle seal?

1. Hand grinder
2. Pry bar
3. Cutting torch
4. Slide hammer

4-66. What component is used to divide engine torque between the front and rear driving axles?

1. Power takeoff
2. Auxiliary transmission
3. Transfer case
4. Power divider

4-67. Shifting is accomplished in a conventional transfer case by what component?

1. Sliding cone clutch
2. External shifting rail
3. Synchronizers
4. Sliding dog clutch

4-68. In a vehicle using a positive traction transfer case, what component is engaged when the rear wheels lose traction and provides power to the front wheels?

1. Sliding cone clutch
2. Synchronizer
3. Sprag unit
4. Energizing springs

4-69. An operator reports that the transfer case is hard to shift. Which of the following problems is NOT a possible cause?

1. Excessive end play
2. Clutch slippage
3. Bent linkage
4. Improperly linkage lubrication

4-70. A power takeoff unit is driven by what shaft of the transmission?

1. Main shaft
2. Countershaft
3. Idler shaft
4. Accessory drive shaft

4-71. Faulty operation of a power takeoff unit is caused by which of the following problems?

1. Damaged linkage
2. Improper spacing between the meshing gears
3. Excessive end play
4. Worn bearings

4-72. To compensate for PTO wear, you must take what action?

1. Add shims
2. Remove shims
3. Adjust the linkage
4. Adjust the control lever